

# THE 5<sup>TH</sup> SYMPOSIUM ON DAMAGE MECHANISM IN MATERIALS AND STRUCTURES

PROGRAMME BOOK

# SDMMS

# 20·21

PENANG, MALAYSIA

8 & 9 MARCH 2021

Organised by:



UNIVERSITI  
TEKNOLOGI  
MARA

Cawangan Pulau Pinang  
Kampus Permatang Pauh



UNIVERSITI  
KEBANGSAAN  
MALAYSIA  
*The National University  
of Malaysia*



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UiTM Cawangan Pulau Pinang  
Symposium Chair  
Symposium Co-Chair

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The 5th Symposium on Damage Mechanism in Materials and Structures (**SDMMS 20·21**) will be held online on 8 - 9 March 2021. This symposium provides a venue for researchers and practitioners in damage mechanisms in materials and structures field from academia, industry and government to meet in a forum where the latest research results are presented and prospects for future developments are discussed. The symposium is organised by the Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang, Faculty of Civil Engineering and Universiti Kebangsaan Malaysia (UKM), Computational and Experimental Mechanics (CEM) Research Groups.

This symposium covers the filed of research and industrial applications, i.e. Mechanical Engineering and Civil Engineering include:

- Fatigue Damage
  - Fatigue Crack Initiation & Propagation
  - Life Prediction techniques
  - Computational Fracture Mechanics
  - Dynamic Fracture
  - Damage Mechanics & Assessment
  - Non Destructive Test
  - Concrete Failure Assessment
  - Failure on Soil Structures
  - Structural Durability & Reliability
  - Structural Health Monitoring
  - Construction Damage Recovery
- and Any relevant topics related to failure analysis.



## Rector UiTM Cawangan Pulau Pinang

On behalf of the SDMMS 20.21 organising committee, I am honoured and delighted to welcome you to SDMMS 20.21. I believe we have chosen a venue that guarantees a successful technical conference amid the culture and scenery of Malaysia.



Our symposium is rich and varied with 5 keynote speeches, around 90 technical papers are divided into three parallel oral sessions each day. We also expect numerous opportunities for informal networking.

As the Symposium Advisor of SDMMS 20.21, I know that the success of the symposium depends ultimately on the people who have worked with us in planning and organising both the technical programme as well as supporting the social arrangements.

We thank the Executive Committee Chairs for their wise advice and brilliant suggestions on organising the technical programme; the Scientific Committee for their thorough and timely reviewing of the papers, and our sponsors who have helped us to keep down the costs of SDMMS 20.21 for all participants. Recognition should go to the Organising Committee members who have all worked extremely hard for the details of important aspects of the symposium programmes and social activities.

Thank You.

Professor Ts. Dr. Salmiah Kasolang @ Kasalung  
Rector  
UiTM Cawangan Pulau Pinang



## Symposium Chair



I wish to express my gratitude to the organising committee from a collaboration between a Faculty of Civil Engineering, Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang and Computational and Experimental Mechanics (CEM)

Research Group, Universiti Kebangsaan Malaysia (UKM) who have put great efforts to make this The 5th Symposium on Damage Mechanism in Materials and Structures (SDMMS 20.21) a ripping event. I would like to honour and delight to welcome all participants to the symposium. I believe we have chosen a platform that guarantees a successful technical conference amid Coronavirus disease (Covid 19) worldwide.

As the Symposium Chair of SDMMS 20.21, I know that the symposium's success depends ultimately on the many people who have worked with us in planning and organizing both the technical program and supporting social arrangements. In particular, we thank the Patron, Symposium Advisors, Honorary Chair and Executive Committees for their wise advice and brilliant suggestion on organizing the technical program. Recognition should go to the Organizing Committee members who have all worked extremely hard together to details important aspects of the conference programs.

In pursuit of academic excellence and world-class standard education, synergy from this collaboration hopefully can bring to the development of sustainable community-university partnerships between higher education institutions. To achieve environmental sustainability on damage and failure, this symposium will be an excellent opportunity for professionals and postgraduate students to exchange ideas and experiences, be creative and visionary, and help redesign a better future for the next generation.

Thank You.

Symposium Chair

Associate Professor Dr. Noorsuhada Md Nor

Faculty of Civil Engineering

UiTM Cawangan Pulau Pinang



## Symposium Co - Chair



Greetings and a warm welcome to the 5th Symposium on Damage Mechanism in Materials and Structures (SDMMS 20.21) which is co-organised by Faculty of Civil Engineering, Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang and Computational and Experimental Mechanics (CEM) Research Group, Universiti Kebangsaan Malaysia (UKM). As the Symposium Co-Chair of SDMMS 20.21, the symposium's success depends ultimately on the presenting participants and organising committee in making this symposium a success. It is actually my 4th participation as an organising committee in this prestigious symposium.

This 2-day symposium will focus on engineering component or structure that is often designed to ensure it perform to a given desired function throughout the design life through the deterministic and nondeterministic techniques. This consists of the method of assessing the damage in the materials, the characterisation techniques and sample applications of the analysis to engineering materials and structures. The discussions include the deterministic and non-deterministic analysis, signal processing for failure analysis, finite element analysis, statistical and probabilistic approaches. Studies include stress analysis by computational simulation, limit-load analysis, material performance, ferrous and nonferrous integrity assessment, fatigue analysis and reliability assessment of structures.

Hence, I would like wish all participants and guest attending the 5th SDMMS 20.21 to have a fruitful discussion that can provide a collaboration platform for academia and industry.

Thank You.

Symposium Co-Chair

Dr. Salvinder Singh Karam Singh

Faculty of Engineering and Built Environment

Universiti Kebangsaan Malaysia



## Organising Committee

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&  
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Malaysia



## Keynote 1

**Dato' Ir. Dr. Goh Teik Cheong**

Executive Director,  
M.E.I. Project Engineers Sdn Bhd,  
Level 20, BHL Tower,  
51 Jalan Sultan Ahmad Shah,  
10050 Penang, Malaysia



### **A Brief Perspective on Foundation Underpinning for Existing Building Structures**

#### **Abstract.**

In structural engineering, sometimes there exists an inevitable need for retrofitting or strengthening of existing building structures. Building structures are not only constantly being exposed to a variety of loading conditions and degrading environmental actions but also to the continuous demands of the industry in the face of technology advancement. Existing factories experiences changes in process equipment in the form of more massive and heavier loading to meet the latest industrial requirements. Selection of right techniques, materials and procedures for the strengthening and underpinning of the existing building structures and foundations therefore, posed a major challenge to even the most experienced professionals in this field. This is so to avoid potential structural failure, reduce safety risks, upgrade the existing capacity and further enhance the durability of the structures. Thus, in-depth understanding of the issues at hand, inspections, desk-studies, analyses, design options that come with cost evaluations and constructability, construction, safety management and monitoring are deemed a prerequisite as far as structural strengthening and foundation underpinning are concerned, all of which have to be conducted in phases to ensure the implementation of a systematic procedure for the works. This paper attempts to put forth procedural recommendations that encompass site inspection, appraisal of the existing structures, site investigations, analyses, various design options, cost considerations, construction methods, safety managements, projects scheduling and monitoring works among other, via 3 selected case studies; then underpinning works of a 5-storey apartment, a 7-storey process tower structure for refinery plant and a 2-storey food additive manufacturing facility.



## Keynote 2

**Professor Ir. Dr. Ahmad Kamal Ariffin Mohd. Ihsan**

Professor in Computational Mechanics,  
PhD, PEng. Department of Mechanical & Materials Engineering,  
Faculty of Engineering and Built Environment,  
Universiti Kebangsaan Malaysia, Malaysia



### **Fatigue-Crack Growth Using Deterministic-Uncertainty Analysis For Metal Components**

#### **Abstract.**

The aim of this talk is to highlight an overview of fatigue crack growth for a metal forming structural component using deterministic-probabilistic-experimental analysis. A finite element model with adaptive remeshing technique is used to accommodate changes in geometry during forming and fracture process. Friction between crack faces is modelled using the six-node isoparametric interface elements. Based on the fracture criterion of soil consolidation, a displacement-based finite element model has been developed to analyze fracture initiation and crack growth. The crack growth and its direction are determined by the calculated stress intensity factors as the maximum circumference theory is also being involved in determining the direction. A square prismatic plate with surface and embedded crack subjected to a fatigue load is considered for fracture analysis. The results from the strategies are compared to highlight the advantages of each sampling strategy. The distributions of the initial surface crack length and depth are extracted from the fatigue tests. The accuracy and consistency are evaluated. The comparison between the stress intensity factors obtained from the finite element, theoretical analysis and experimental work are compared.



## Keynote 3

**Dr. Musa Bashir**

Senior Lecturer,  
Department of Maritime and Mechanical Engineering,  
Faculty of Engineering and Technology,  
Liverpool John Moores University,  
Liverpool, England



### **Damage Diagnosis And Prognosis Of A Floating Offshore Wind Farm: A Case Study of Maintenance Strategy Of A 10 MW Multi-Body Offshore Wind Turbine**

**Abstract.**

The concept of Floating Offshore Wind Farms (FOWF) is re-emerging as a viable technology in the extraction of offshore wind power in deep-water locations where wind resources exist in abundance. A key challenge to the success of FOWF is the cost reduction of its operation and maintenance. FOWFs are generally located in a remote offshore environments where accessibility is often limited by environmental conditions, leading to a significant impact on the Levelized Cost of Electricity (LCOE). Therefore, this presentation aims to discuss the maintenance strategies of FOWFs based on structural health monitoring and prognostic management methods. The presented case study examines the dynamic responses of a 10 MW spar-type multi-body offshore wind turbine. The platform is made of upper and lower structures connected by tendons. Breakage scenarios of the tendons under different environmental and operating conditions are investigated to identify the condition and health indicators needed for damage diagnosis of the platform. Similarly, diagnosis of the tendon damage is conducted to evaluate tendon failure in different scenarios, thus the remaining useful life of the platform can be accurately established. Preventive maintenance methodologies are evaluated to determine their effectiveness in early stage damage detection to optimise LCOE.



## Keynote 4

**Ir. Hambali Chik**

PETRONAS Group Technical Solutions (GTS),  
Level 6 Menara Dayabumi  
Jalan Sultan Hishamuddin,  
50050 Kuala Lumpur, Malaysia



### **Managing Damage Mechanisms: A Cradle To Grave Journey**

#### **Abstract.**

Fixed equipment and associated components in oil and gas facilities are designed, installed and operated within oil and gas industry are subjected to various types Damage Mechanisms throughout the facilities operating life cycles. The success of managing Damage Mechanisms affecting these equipment and components are primarily influenced by critical decisions made at various stages of equipment life cycle from the design, construction, operations until decommissioning of the assets and specific equipment. The industry is facing depleting reserve in which easy to access hydrocarbon resources days becoming a distant past, there is a pressing need to implement cost compression measures at various stages of the asset life cycle necessitate a fit-for purpose (FFP) approach to Damage Mechanisms management. This paper will discuss various measure taken to manage Damage

Mechanisms at critical stages of oil and gas facilities life cycle with the aim to meet asset performance objectives while keeping the cost & safety targets attainable by implementation of FFP materials selection, Quality Management System at the Design and Construction Stages, implementation of Risk Based Inspection and deployment of advance technology to predict, detect and measure active Damage Mechanisms at operational stage. Extension of asset useful life through Asset Life Extension Study (ALES) and implementation of FFP inspection, testing and maintenance program by demonstrating operational risk are at As Low As Reasonably Practical (ALARP) by keeping all active Damage Mechanisms are well within expected limits will assure business targets are met without compromising Health, Safety and Environmental (HSE) objectives.



**Keynote 5****Associate Professor Dr. Wonsiri Punurai**

Associate Professor of Civil Engineering  
Department of Civil and Environmental Engineering,  
Faculty of Engineering,  
Mahidol University, Thailand

**Metaheuristic Techniques for Automatic Detection of Denting  
Damage in an Offshore Jacket Platform****Abstract.**

Over decades, the interest in developing techniques for long-term online monitoring of aging engineering structures has greatly increased. Instead of inspecting the system at fixed time intervals, researchers want to monitor its health in service, by continuously extracting characteristic parameters that allow conclusions to be drawn on the structure's useful remaining lifetime, the next repair/maintenance, or the need for immediate shutdown. Motivated by concept of smart structure (with respect to its dynamic behavior), an existing structure is to retrofit with a set of sensors. To see if structural condition has changed, the actual measurement data have to be evaluated and compare to the reference values which derive from the undamaged state of the monitored system through time frequency representations. However, it can be very difficult to link the evaluation of the measurement data with the physical interpretation of the damage states. For these reasons, the vibration-based structural health using metaheuristic approach should be advantageous. By applying this technique, the damage detection is considered as an optimization inverse problem and the unknown parameters of damage can be forecasted automatically and accurately through the deviation minimization between experimental and simulated vibration responses. This research discusses the use of adaptive metaheuristics algorithm to provide an automatic detection of denting damage in an offshore structure. A model is developed combining with the percentage of the dent depth of damaged member diameter and is used to assess the performance of the method. To investigate the performance, the proposed technique is used to solve the optimization problem and compared with other well-known self-adaptive metaheuristics. Then the Wilcoxon rank sum test is used to rank and compare the performance of the technique among all MH optimizers. It is demonstrated that good results are obtained with accuracy and lower computational time for the case of localization of dent damage occurring simultaneously in jacket legs and diagonal braces after impacts or ship collisions.



**DAY 1 : MARCH 8, 2021 (MONDAY)**

TIME	TENTATIVE	ONLINE ROOM LINK
0900 - 0910	<b>CHAIRMAN REMARKS &amp; DOA</b>	<a href="http://shorturl.at/INRT7">http://shorturl.at/INRT7</a>
	<b>WELCOMING REMARKS</b>	
0910 - 0915	Associate Professor Dr. Noorsuhada Md Nor Symposium Chair	
0915 - 0920	Professor Ir. Dr. Shahrum Abdullah Honourable Advisor	
0920 - 0925	<b>OPENING CEREMONY</b> Professor Ts. Dr. Salmiah Binti Kasolang Rector UiTM Cawangan Pulau Pinang	
0930 - 1010	<b>KEYNOTE SESSION 1</b> Dato' Ir. Dr. Goh Teik Cheong Executive Director, M.E.I. Project Engineers Sdn Bhd	
1010 - 1050	<b>KEYNOTE SESSION 2</b> Professor Ir. Dr. Ahmad Kamal Ariffin Mohd. Ihsan Professor in Computational Mechanics, PhD, PEng. Department of Mechanical & Manufacturing Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, Malaysia	
1050 - 1100	<b>BREAK</b>	
1100 - 1320	<b>PARALLEL SESSION 1</b> Room 1 : Smart Class Room Room 2 : Perdana 1 Room 3 : Research Garden	<a href="http://shorturl.at/INRT7">http://shorturl.at/INRT7</a> <a href="http://shorturl.at/fzEIN">http://shorturl.at/fzEIN</a> <a href="http://shorturl.at/dgzN3">http://shorturl.at/dgzN3</a>



## DAY 1 : MARCH 8, 2021 (MONDAY)

TIME	TENTATIVE	ONLINE ROOM LINK
1400 - 1440	<b>KEYNOTE SESSION 3</b> <b>Dr. Musa Bashir</b> Senior Lecturer, Department of Maritime and Mechanical Engineering, Faculty of Engineering and Technology, Liverpool John Moores University, Liverpool, England	<a href="http://shorturl.at/INRT7">http://shorturl.at/INRT7</a>
1445 - 1705	<b>PARALLEL SESSION 2</b> Room 1 : Smart Class Room Room 2 : Perdana 1 Room 3 : Research Garden	<a href="http://shorturl.at/INRT7">http://shorturl.at/INRT7</a> <a href="http://shorturl.at/fzEIN">http://shorturl.at/fzEIN</a> <a href="http://shorturl.at/dgzN3">http://shorturl.at/dgzN3</a>
1705	<b>BREAK &amp; CONTINUE DAY 2</b>	



**DAY 2 : MARCH 9, 2021 (TUESDAY)**

TIME	TENTATIVE	ONLINE ROOM LINK
0900 - 0940	<b>KEYNOTE SESSION 4</b> Ir. Hambali Chik PETRONAS Group Technical Solutions (GTS), Level 6 Menara Dayabumi, Jalan Sultan Hishamuddin, Kuala Lumpur, Malaysia	<a href="http://shorturl.at/INRT7">http://shorturl.at/INRT7</a>
0940 - 1020	<b>KEYNOTE SESSION 5</b> Associate Professor Dr. Wonsiri Punurai Department of Civil and Environmental Engineering, Faculty of Engineering, Mahidol University, Thailand	
1020 - 1305	<b>PARALLEL SESSION 3</b> Room 1 : Smart Class Room Room 2 : Perdana 1 Room 3 : Research Garden	<a href="http://shorturl.at/INRT7">http://shorturl.at/INRT7</a> <a href="http://shorturl.at/fzEIN">http://shorturl.at/fzEIN</a> <a href="http://shorturl.at/dgzN3">http://shorturl.at/dgzN3</a>
1305- 1400	<b>BREAK</b>	
1400 - 1640	<b>PARALLEL SESSION 4</b> Room 1 : Smart Class Room Room 2 : Perdana 1 Room 3 : Research Garden	<a href="http://shorturl.at/INRT7">http://shorturl.at/INRT7</a> <a href="http://shorturl.at/fzEIN">http://shorturl.at/fzEIN</a> <a href="http://shorturl.at/dgzN3">http://shorturl.at/dgzN3</a>
1640 - 1700	<b>CLOSING CEREMONY</b> Announcement: Best Presenter Award Following SDMMS Organiser	<a href="http://shorturl.at/INRT7">http://shorturl.at/INRT7</a>



Date: 8 March 2021 (Monday)

Session 1: 1100 - 1320

Room 1: Smart Class Room ( <http://shorturl.at/INRT7>)

Session Chair: Dr. Abdul Hadi Azman

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1100 - 1120	(ID 4) Fatigue Reliability Assessment of Random Road Excitations using Probabilistic Approaches <i>Chuin Hao Chin, Shahrum Abdullah, Salvinder Singh Karam Singh, Ahmad Kamal Ariffin and Dieter Schramm.</i>
1120 - 1140	(ID 116) Interface Formation During Co-Sintering Process of 2C-PIM SS17-4PH and SS316L on Mechanical Properties <i>Abu Bakar Sulong</i>
1140 - 1200	(ID 55) Comparison of Load vs Displacement between Site Investigation and Experimental Work of Prestressed Monoblock Concrete Sleeper (PMCS) under Dynamic Loading <i>Mohd Ikmal Fazlan Rozli</i>
1200- 1220	(ID 7) Work and Energy Response of Hostel Building of UiTM Pulau Pinang under Earthquake Excitation <i>Mohd Samsudin Abdul Hamid, Norul Mas Diyana Ahmad, Kay Dora Abd Ghani, Adhilla Ainun Musir and Daliah Hasan.</i>
1220 - 1240	(ID 27) Limit Cycle Oscillation (LCO) Flutter of Advanced High Modulus Graphite/epoxy Composite Oscillating <i>Nur Azam Abdullah, Erwin Sulaeman and Meor Iqram Meor Ahmad.</i>
1240- 1300	(ID 10) Development of Optimal Work Pattern Framework for Malaysian Construction Workers <i>Siti Hafizan Hassan, Mohd Samsudin Abdul Hamid, Nur Izzyanie Zainal, Zulfairul Zakariah, Nurulzatushima Abdul Karim and Adhilla Ainun Musir</i>
1300 - 1320	(ID 21) Crumb Rubber Effect in Portland Cement Concrete <i>Nadiah Md. Husain and Norfarah Nadia Ismail</i>



Date: 8 March 2021 (Monday)

Session 1: 1100 - 1320

Room 2: Perdana 1 (<http://shorturl.at/fzEIN>)

Session Chair: Dr. Masyitah Md Nujid

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1100 - 1120	(ID 11) Potential of Sandwich Structure in Damage Mechanism: Delamination <b>Mohd Khairul Faidzi</b> , Shahrum Abdullah, Mohamad Faizal Abdullah, Abdul Hadi Azman, David Hui and Salvinder Singh Karam Singh
1120 - 1140	(ID 12) Evaluation on Crack Pattern For Concrete Masonry Wall Column <b>Daliah Hasan</b> , Mohd Samsudin Abdul Hamid and Adhilla Ainun Musir
1140 - 1200	(ID 14) A Review on Response of Shear Wall Location Due to Earthquake Effect in High-Rise Rc Structures <b>Nasr Abdulrahman</b> , Dr. Shamilah Anudai Anuar and Dr. Nik Zainab Nik Azizan
1200- 1220	(ID 15) Numerical Analysis of Soil Failure Envelope Using Different Methods <b>Badrul Nizam Ismail</b> , Nor Hafizah Hanis Abdullah and Juhaizad Ahmad
1220 - 1240	(ID 17) The Effects of Curing Temperature to Damage Behavior in Cross-ply Cloth CFRP Laminates <b>M.J. Mohammad Fikry</b> , Shunichi Kagami and Shinji Ogihara
1240- 1300	(ID 18) Fatigue Life Assessment Based-on Modal Analysis of a Vehicle Coil Spring Using Power Spectral Density <b>Reza Manouchehrynia</b> , Shahrum Abdullah and Salvinder Singh Karam Singh
1300 - 1320	(ID 63) Utilisation of NDT Approach in Assessing Concrete Integrity <b>Nurliza Jasmi</b> , Muhd Norhasri Muhd Sidek, Rosnani Md Saini, Mohd Shafee Harun and Mohd Afiq Mohd Fauzi



Date: 8 March 2021 (Monday)

Session 1: 1100 - 1320

Room 3: Research Garden (<http://shorturl.at/dgzN3>)

Session Chair: Dr. Salvinder Singh Karam Singh

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1100 - 1120	(ID 19) Simulation of Fatigue Crack Initiation of Isotropic in FRP Laminate <i>Roslin Ramli, Mohd Hisbany Mohd Hashim, Suhailah Mohamed Noor, Anizahyati Alisibramulisi and Muhammad Azrie Husainy Mohd Jasri</i>
1120 - 1140	(ID 20) The Roles of Developers in Join Management Body For High-Rise Residential Buildings Common <i>Darul Nafis Abas, Rozana Zakaria, Eeydzah Aminudin, Nurul Asmiera Ab Lah, Nur Syafiqah Aini Mohamad Nor Sharin and Shaza Rina Sahamir</i>
1140 - 1200	(ID 23) Entropy Model for Fatigue Crack Growth Rate Prediction under Block Spectrum Loading <i>Roslinda Idris, Shahrum Abdullah, Prakash Thamburaja and Mohd Zaidi Omar</i>
1200- 1220	(ID 24) Energy Absorption of Weathered Rock with Cyclic Stress History <i>Nurul Ainain Mohd Salim</i>
1220 - 1240	(ID 124) Rework in Malaysian Construction Project <i>Nor Janna Tammy, Isna Izzani Ismail and Zuraisah Dollah</i>
1240- 1300	(ID 38) Structural Analysis and Characterization of Silver based Conductive Ink for Stretchable Electronics Application <i>Sana Zulfiqar, Abdullah Aziz Saad, Zulkifli Ahmad and Zuraihana Bachok</i>
1300 - 1320	(ID 106) Characterization of Fatigue and Crack Growth on AZ31B Magnesium Alloy <i>Helmi Isahak, Muhammad Faizal Abdullah, Mohd Khairul Faidzi, Aidy Ali and Muhammad Muaz Mubasyir Roslan</i>



Date: 8 March 2021 (Monday)

Session 2: 1445- 1725

Room 1: Smart Class Room (<http://shorturl.at/INRT7>)

Session Chair: Associate Professor Dr. Noorsuhada Md Nor

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1445 - 1505	(ID 26) The evaluation of fracture mechanics parameter by path-integral and load-displacement approach using finite element analysis <i>Soo Hau Heng and Dr. Muhamad Safwan Muhamad Azmi</i>
1505 - 1525	(ID 8) Structural Performance of Building Under Seismic Response: Case Study of Delima Hostel Universiti Teknologi Mara, Pulau Pinang <i>Mohd Samsudin Abdul Hamid, Norul Mas Diyana Ahmad, Kay Dora Abd Ghani, Siti Hafizan Hassan and Nurulzatushima Abdul Karim.</i>
1525 - 1545	(ID 28) Computational Modelling of Bird Strike Impact on an Aluminium Alloy Plate via Coupling of FE-SPH <i>Nur Azam Abdullah, Mohammad Daniel Yusoff, Sharis-Shazzali Shahimi and Meor Iqram Meor Ahmad</i>
1545- 1605	(ID 33) Development of Peridynamic Model for Impact Test of Polypropylene and Polycarbonate <i>Muhammad Azim Azizi, Anas Ahmad Fahad and Sharafiz Abdul Rahim</i>
1605 - 1625	(ID 35) Numerical Evaluation of Monkman-Grant Strain Based Damage Model to Predict Creep Rupture Time <i>Nasrul Azuan Alang, Zainuddin Sajuri, Juliawati Alias and Nur Atiqah Sulaiman</i>
1625 - 1645	(ID 90) A Study on CO2 Emissions and Cost Estimates of Wastepaper Sludge Ash in Controlled Low-Strength Material <i>Mohd Azrizal Fauzi, Noorsuhada Md Nor, Mohd Fadzil Bin Arshad and Muhamad Faizal Pakir Mohamed Latiff</i>
1645 - 1705	(ID 37) Influence of a Ternary Blended Pozzolan Materials on Mechanical Properties of Self Compacting Concrete Subjected to Elevated Temperature <i>Abubakar Muhammad, Magaji M. Garba, Abdullahi N. Zadawa and Musa Mohammed</i>



Date: 8 March 2021 (Monday)

Session 2: 1445- 1705

Room 2: Perdana 1 (<http://shorturl.at/fzEIN>)

Session Chair: Dr. Soffian Noor Mat Saliah

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1445 - 1505	(ID 108) Damage Evaluation of RC Beam-Column Joint using Acoustic Emission Signal <i>Muhammad Zakaria Mohamad, Noorsuhada Md Nor, Soffian Noor Mat Saliah, Azmi Ibrahim, Aimi Munirah Jalilluddin and Kay Dora Abd Ghani</i>
1505 - 1525	(ID 40) Non-Destructive Evaluation of Rigid Pavement Using Spectral Analysis of Surface Waves (SASW) Method <i>Nur Aina Farahana Abdul Ghani, Norfarah Nadia Ismail, Wan Nur Aifa Wan Azahar, Faridah Abd. Rahman, Amelia Wong Azman, Nur Izzi Md. Yusoff and Sri Atmaja P. Rosyidi</i>
1525 - 1545	(ID 41) Green Index Criteria and Carbon Assessment - A tool of Managing Damages Recovery for Road Operation and Maintenance <i>Jeffryl Azniel Adzar, Rozana Zakaria, Eeydzah Aminudin, Dayalan Rainoo Raj, Rozelawati Ishak, Mohamad Faizal Sahadan, Ridzuan Mohd Radzi, Mohamad Hafizuddin Syafiq Abd Rashid, Vikneswaran Munikan, Siti Mazzuana Shamsudin and Sherliza Zaini Sooria</i>
1545- 1605	(ID 89) Damage Evaluation of SFRC Beam Strengthened with CFRP using Acoustic Emission <i>Noorsuhada Md Nor, Abdul Hakeem Zulkifli, Soffian Noor Mat Saliah and Noor Syafeekha Mohamad Sakdun</i>
1605 - 1625	(ID 44) Mixed-mode I-II-III Delamination using Ten-Point Bending Plate Test <i>K.J. Wong, M. Johar, H.A. Israr and M.N. Tamin</i>
1625 - 1645	(ID 36) Performing Energy Absorption AZ31B Using Quenching on Nano Fluid <i>Muhammad Muaz Mubasyir Roslan, Mohamad Faizal Abdullah, Ku Zarina Ku Ahmad, Raja Nor Izawati Raja Othman and Abdullah Helmi Isahak.</i>
1645 - 1705	(ID 48) Effect of Bio-Based Lubricants on the Performance of Rotor Bearing System: A Review <i>Muhammad Imran Sadiq, Wan Aizon Wan Ghopa, Mohd. Zaki Nuawi, Mohammad Rasidi Mohammad Rasani and Tajammal Imran</i>



Date: 8 March 2021 (Monday)

Session 2: 1445- 1705

Room 3: Research Garden (<http://shorturl.at/dgzN3>)

Session Chair: Associate Professor Ts. Dr. Mohd Hisbany Mohd Hashim

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1445 - 1505	(ID 50) Web-Based Expert System for Flexible Pavement Maintenance in Tropical Region <i>Salaheddin Arafa, Abdalrhman Milad, Nur Izzi Md Yusoff, Otman M. M. Elbasir and Ahmed M A Elmesh</i>
1505 - 1525	(ID 51) An Assessment of Linear Viscoelastic Responses of Asphalt Cement <i>Ahmed Suliman B. Ali, Abdalrhman Milad Milad, Nur Izzi Md Yusoff, Allam Musbah Al Allam and Mohd Idrus Mohd Masirin</i>
1525 - 1545	(ID 68) Review Study of The Liquefied Gravity Flow-Induced Tsunami: Case Study of Sabah Bays <i>Noor Sheena Herayani Harith, Isabella Boy Setanis, Ejria Saleh and Lau Tze Liang</i>
1545- 1605	(ID 53) Durability Assessment of Automobile Suspension Lower Arm under Random Road Loads in the Time Domain <i>Nazirul Muhaimin Hamzi, Salvinder Singh Karam Singh, Shahrul Abdullah, Abdul Hadi Azman, Mohammad Rasidi Mohammad Rasani and Airee Afiq Abd Rahim</i>
1605 - 1625	(ID 54) Improving the Strength of Subgrade Soil using Crumb Rubber as a Stabilizer Agent <i>Juliana Idrus, Aina Syahira Shafie, Rozaini Ramli, Masyitah Md Nujid, Khairul Afinawati Hashim and Nur Shafieza Azizan</i>
1625 - 1645	(ID 6) Failure Analysis of Strip Footing with Temperature Effect on Sand Strength <i>Masyitah Md Nujid</i>
1645 - 1705	(ID 49) Comparison of Lattice Structure Configurations using Modal and Harmonic Response Analysis <i>Sajjad Hussain and Wan Aizon Wan Ghopa</i>



Date: 9 March 2021 (Tuesday)

Session 3: 1025 - 1305

Room 1: Smart Class Room (<http://shorturl.at/INRT7>)

Session Chair: Professor Dr. Mohd Nasir Tamin

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1025 - 1045	(ID 56) Performance appraisal of wastepaper sludge ash as controlled density fill material <b>Mohd Azrizal Fauzi</b> , Mohd Fadzil Bin Arshad, Noorsuhada Md Nor and Setphen Kiai
1045 - 1105	(ID 5) Risk Assessment of Fatigue Life Data Under Random Strain Load using Gumbel Distribution <b>Chuin Hao Chin</b> , Nadia Nurnajihah Mohamad Nasir, Salvinder Singh Karam Singh, Shahrum Abdullah and Sallehuddin Mohamed Haris.
1105 - 1125	(ID 58) Decomposition of Strain Signal Using Wavelet Transform Method for Automobile Coil Spring <b>Airee Afiq Abd Rahim</b> , Shahrum Abdullah, Salvinder Singh Karam Singh and Mohd. Zaki Nuawi
1125- 1145	(ID 59) Effect of Repairing Techniques to the Strength of Pre-Damaged Reinforced Concrete Beams Noorsuhada Md Nor, <b>Soffian Noor Mat Saliah</b> , Noorhazlinda Abd Rahman and Norrul Azmi Yahya
1145 - 1205	ID 60) Fatigue Assessment of Additively Manufactured Lattice Structure: A review <b>Asliah Seharing</b> , Abdul Hadi Azman and Shahrum Abdullah
1205- 1225	(ID 61) Fractal Dimensions of a Propagating Fatigue Crack in Metallic Materials <b>Mudassar Hussain Hashmi</b> , Mohd Foad Abdul-Hamid, Ainulotfi Abdul-Latif, Mohd Nasir Tamin and Muhammad Adil Khattak
1225 - 1245	(ID 64) Magnetic Flux Leakage Detection using Metal Magnetic Memory Technique for Tower Crane Pulley <b>Syed Muhamad Firdaus Syed A. Wahab</b> , Azli Arifin, Shahrum Abdullah and Siti Norbayah Sahadan
1245 - 1305	(ID 62) CrackLabel: A New Image Labeling Tool for Automated Crack Detection in Asphalt Pavement Images <b>Nor Aizam Muhamed Yusof</b> , Muhammad Khusairi Osman and Mohd Halim Mohd Noor



Date: 9 March 2021 (Tuesday)

Session 3: 1025 - 1305

Room 2: Perdana 1 (<http://shorturl.at/fzEIN>)

Session Chair: Associate Professor Dr. Kay Dora Abd Ghani

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1025 - 1045	(ID 65) Statistical Characterisation for Durability Assessment under Various Road Loads <b>Lennie Abdullah</b> , Salvinder Singh Karam Singh, Abdul Hadi Azman, Ahmad Kamal Ariffin, Shahrum Abdullah, Yat Sheng Kong and Nazirul Muhaimin Hamzi
1045 - 1105	(ID 69) Determination of Suitable Ground Motion Prediction Equations for Sabah Region <b>Noor Sheena Herayani Harith</b> , Nur Afifah Kassim, Samnursidah Samir and Azlan Adnan
1105 - 1125	(ID 43) The Effect of Wave Velocity and Distance of Fracture on Granite Nur Fazlinieza Khairosam, <b>Khairul Afinawati Hashim</b> and Noorsuhada Md Nor
1125- 1145	(ID 72) Effect of Anvil Configuration on Stress Evolution of Aluminium Alloy in High-Pressure Torsion Deformation <b>Fauziana Lamin</b> , Ahmad Kamal Ariffin and Intan Fadhlina Mohamed
1145 - 1205	(ID 73) Fatigue Failure Detection in Glass Fiber Reinforced Polymer by Fiber Bragg Grating sensor <b>Miminorazeansuhaila Loman</b> and Mohd Hafizi Zohari
1205- 1225	(ID 25) A Comparison on Various Retrofitting Techniques for School Building Preparedness on Earthquake Damage <b>Choo Kok Wah</b> , Rozana Zakaria, Azlan Adnan, Vikneswaran Munikanan and Muhammad Faiz Abdul Rahman
1225 - 1245	(ID 126) Evaluate the Influence of Laminated Layer Sequence of Plain Woven Bamboo on Tensile and Impact Performance of E-glass Woven / Epoxy Hybrid Composite <b>Kannan Rassiah</b> , Aidy Ali and Muhadir Saeman
1245 - 1305	(ID 98) Finite Element Analysis on Stress Distribution of Different Dental Implant Micro-thread Design <b>Sau Chuan Tan</b>



Date: 9 March 2021 (Tuesday)

Session 3: 1025 - 1305

Room 3: Research Garden (<http://shorturl.at/dgzN3>)

Session Chair: Professor Ir. Dr. Shahrum Abdullah

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1025 - 1045	(ID 77) An Experimental Study on the Ballistic Performance of Fragment Simulating Projectile (FSP) against Aluminium Plates <i>Mohd Rozaiman Aziz, Mohd Faez Zainol and Rozaini Othman</i>
1045 - 1105	(ID 78) Effects of High Temperatures on The Compressive Strength of Concrete Cylinders with CFRP Sheets <i>Nur Aiman Suparlan, Hazrina Ahmad and Mohd Hisbany Mohd Hashim</i>
1105 - 1125	(ID 79) A Review of Dental Implant Failures due to Biomechanical Overloading <i>Muhammad Ikman Ishak, Ruslizam Daud, Ishak Ibrahim, Fauziah Mat and Nurul Najwa Mansor</i>
1125- 1145	(ID 81) Life-Span Prediction of Limestone and Anthracite Coal Filter Media in Adsorbing Fe <sup>2+</sup> from groundwater using Breakthrough Curve Analysis <i>Nor Azliza Akbar, Hamidi Abdul Aziz, Mohd Nordin, Badrul Nizam Ismail and Nurazim Ibrahim</i>
1145 - 1205	(ID 82) Damage Assessment of Reinforced Concrete Beam Strengthened with CFRP using Acoustic Emission Technique <i>Soffian Noor Mat Saliah, Noorsuhada Md Nor, Noorhazlinda Abd Rahman and Mohd Subri Tahir</i>
1205- 1225	(ID 120) Shear Strength Prediction of Composite Soil on Bearing Capacity Failure Analysis <i>Masyitah Md Nujid</i>
1225 - 1245	(ID 125) Photomechanics of Fiber-reinforced Polymer Composite Laminates using Digital Image Correlation Technique <i>Intanifizieana Mohd Ariff, Syazwan Ahmad Rashidi and Mohd Nasir Tamin</i>
1245 - 1305	(ID 83) Critical Analysis of Accuracy of On-Stream Data for Integrity Assessment <i>Muhammad Zaid Kamardin, Hambali Chik and Muhammad Afiq Mansor</i>



Date: 9 March 2021 (Tuesday)

Session 4: 1400- 1640

Room 1: Smart Class Room (<http://shorturl.at/INRT7>)

Session Chair: Professor Dr. Aidy Ali

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1400 - 1420	(ID 85) Anisotropic Deformation Model for Progressive Damage Mechanism of Hawkesbury Sandstone Incorporating The Inherent Mobilized Shear Strength <b>Noorfaizah Hamzah</b> , Nur'Ain Mat Yusof and Mohd Jamaludin Md Noor
1420 - 1440	(ID 88) Vibration Impact of Column Face due to Driven Pile at Petronas Bandar Sunway, Seberang Jaya <b>Nurulzatushima Abdul Karim</b> , Adhilla Ainun Musir, Mohd Samsudin Abdul Hamid and Siti Hafizan Hassan
1440 - 1500	(ID 70) Development of Assessment Framework for Building Defects in Malaysian Construction Industry <b>Siti Hafizan Hassan</b> , Mohd Samsudin Abdul Hamid, Syahrul Fithry Senin, Zulfairul Zakariah, Mohamad Zain Hashim and Mohd Faisal Zaini
1500 - 1520	(ID 91) Mechanical and Failure Analysis of Multi-Materials Adhesive Joining <b>Gimash Kavishka Dias</b> , Novita Sakundarini and Christina Chin May May
1520 - 1540	(ID 57) Optimising Mixture Design for Controlled Density Fill Materials: A Statistical approach <b>Mohd Azrizal Fauzi</b> , Mohd Fadzil Bin Arshad, Noorsuhada Md Nor
1540 - 1600	(ID 94) Prediction of Stress-Strain Failure Curve and Preconsolidation Stress Using RMYSF <b>Juhaizad Ahmad</b> , Mohd Jamaludin Md Noor, Ismacahyadi Bagus Mohamed Jais, Abdul Samad Abdul Rahman, Basharudin Abdul Hadi and Mohd Ikmal Fazlan Rozli
1600 - 1620	(ID 117) Kernel Principal Component Analysis for Structural Health Monitoring and Damage Detection of an Engineering Structure under Operational Loading Variations <b>Sharafiz Abdul Rahim</b>
1620 - 1640	(ID 86) Creep Life Simulation and Assessment of Pressure Vessel Exposed to Elevated Process Gas Temperature <b>Hashim Othman</b> , Nurul Hana Kamaruzaman and Ir. Hambali Chik



Date: 9 March 2021 (Tuesday)

Session 4: 1400- 1640

Room 2: Perdana 1 (<http://shorturl.at/fzEIN>)

Session Chair: Dr. Mohd Shamil Shaari

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1400 - 1420	(ID 97) The Effect of Kenaf Core To The Thermal Conductivity of Kenaf Core - Quarry Dust Brick (KCQB) <b>Abdul Hadi Hassan</b> , Mohd Fadzil Arshad and Nurul Aini Salehuddin
1420 - 1440	(ID 100) Site Investigation Od Prestressed Concrete Sleeper for Two Different Soil Condition <b>Mashita Harun</b> , Mohd Ikmal Fazlan Rozli and Assoc Prof Dr Kay Dora Abd Ghani
1440 - 1500	(ID 104) The Piling Vibration effect to Drainage at Construction Site <b>Adhilla Ainun Musir</b> , Mohd Samsudin Abdul Hamid, Nurulzatushima Abdul Karim and Daliah Hasan
1500 - 1520	(ID 121) Awareness Study of Downstream Community Towards Dam Failure: A Case Study of Bukit Merah Dam <b>Nurhidayati Mat Daud</b> , Siti Hafizan Hassan, Mohd Izzat Joohari, Nuraini Tutur, Sabariah Badrealam, Ernie Abdul Manan and Ahmad Farhan Hamzah
1540 - 1600	(ID 118) Determination of Thermal Expansion for Ball Grid Array using Digital Image Correlation <b>Yat Sheng Kong</b>
1520 - 1540	(ID 93) Numerical Modelling of Carbon Fibre Reinforced Plastic (CFRP) Wrapped Concrete Bearing <b>Norru Azmi Yahya</b> , Noorsuhada Md Nor, Mohd Raizamzamani Md Zain, Chai Lian Oh and Siong Wee Lee
1600 - 1620	(ID 95) Optimization of Quicklime Production from Eggshell Using Response Surface Methodology <b>Salisu Nuhu</b>
1620 - 1640	(ID 99) Transverse bending vibrations of a 4 DOF modified Jeffcott rotor system with a transverse fatigue crack in its shaft <b>Shravankumar Chandrasekaran</b> , S.S.K. Singh, Guru Kumar and Prabu J.



Date: 9 March 2021 (Tuesday)

Session 4: 1400- 1640

Room 3: Research Garden (<http://shorturl.at/dgzN3>)

Session Chair: Dr. Muhammad Faizal Abdullah

TIME	PAPER ID/TITLE PRESENTER/AUTHOR
1400 - 1420	(ID 109) Potential Application of Steel Fiber as replacement of Steel Reinforcement in Concrete Slab for Engineering Application <b>Siti Junnaidah Baserah</b> , Nur Azwa Muhamad Bashar and Yee Hooi Min
1420 - 1440	(ID 110) Data Clustering Model based on Gaussian Mixture Model and Expectation-Maximization Algorithm for Data-driven Structural Health Monitoring System <b>Sharafiz Abdul Rahim</b> and Muhammad Azim Azizi
1440 - 1500	(ID 113) A Review on the Effect of Heat Treatment on Microstructure and Mechanical Properties of AISi10Mg Fabricated by Additive Manufacturing <b>Sze Pei Tan</b> and Mohd Shamil Shaari
1500 - 1520	(ID 115) Creep Rupture Life and Ductility of Ex-service P91 steel Under Multiaxial Stress State <b>Norhaida Ab. Razak</b>
1520 - 1540	(ID 67) Investigation on Vulnerable Buildings Due to Earthquake in Kota Kinabalu <b>Noor Sheena Herayani Harith</b> , Viliانا Jainih, Mohd Azizul Ladin and Mohd Irwan Adiyanto
1540 - 1600	(ID 9) Acoustic Emission of Reinforced Concrete Beam at Early Stage of Fatigue Loading <b>Noorsuhada Md Nor</b> , Soffian Noor Mat Saliah and Mohd Subri Tahir
1600 - 1620	(ID 71) Numerical validation of single edge notched tension specimen of high strength steel for fatigue crack propagation with conventional specimen. <b>Yusuf Olanrewaju Busari</b> , Shahrum Abdullah and Yupiter Harangan Prasada Manurung





## ACKNOWLEDGEMENT

On behalf of the Organising Committee of SDMMS 20.21, we wish to express our deepest gratitude and sincere appreciation to all supporting organisations for their continuous support in making SDMMS 20.21 a great success. THANK YOU!



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